User's Manual

rational acoustics®

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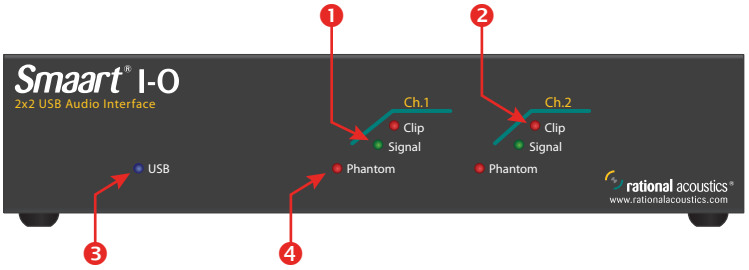
Overview

The Smaart I-O is a 2-in, 2-out, mic preamp and USB audio interface device designed specifically for professional audio measurement applications. It is designed to accommodate signal levels common in professional audio systems, to integrate seamlessly with Smaart acoustic measurement and analysis software and to be solid, simple and easy to use. The Smaart I-O features balanced differential inputs and outputs, low-noise programmable gain microphone preamps with 50 dB of gain in 1 dB steps, an extremely stable and robust 48V phantom power supply and precision referenced ADAC to ensure consistent electrical sensitivity, linkable sample clock and external powering options, all packed into a compact package with no external controls.

A simple control program (included on the supplied CD ROM) sets preamp gains and phantom power selection, and automatically integrates with Smaart measurement and analysis software. The control program also provides firmware update capability and can rename the Smaart I-O at the hardware level – an important feature when using multiple devices with Smaart.

The Smaart I-O by Numbers

Front Panel



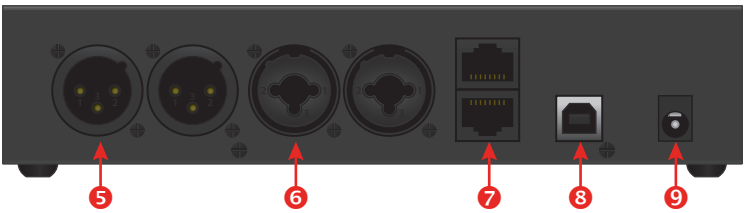
1. Signal presence indicators illuminate when the input signal level exceeds about -27 dB FS.

2. Clip indicators light up when input signal levels exceed -6 dB FS.

3. USB indicator glows blue when connected to your computer, purple to indicate external clocking, or flashes red if unable to connect.

4. Phantom power LEDs light when 48 V phantom power is turned on.

Back Panel



5. Balanced line level outputs.

6. Balanced Mic. Line inputs. Jack accepts XLR or 1/4" balanced or unbalanced TRS or TS connector. 1/4" input has a ~20 dB pad inline and is not connected to the phantom power supply.

7. Sync ports for synchronizing the sample clocks between multiple Smaart I-Os. Accepts standard RJ-45 Ethernet patch cables.

8. USB connector.

9. Optional external power connector. Normally the Smaart I-O is powered by the USB port on your computer and requires no external power. However you can also connect a 5 Volt DC power supply to this jack if you do not wish to port power the Smaart I-O for some reason, for example if your computer is unable to supply sufficient power for stable operation.

Hardware Installation

Physical installation of the Smaart I-O is just matter of connecting it to one of the USB ports on your computer using a standard USB peripheral cable (supplied). The Smaart I-O is a USB Audio Class device, meaning the drivers for it are built into the MacOS and Windows operating systems and should be loaded automatically when the device is detected.

Software Installation

Windows users: Run setup.exe from the CD included in your package (or better yet, download the latest version from the Rational Acoustics web site) and follow the prompts in the installation wizard.

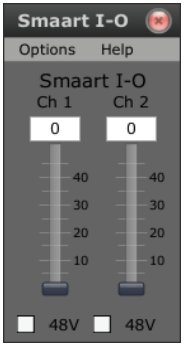
Mac users: Drag the Application bundle from the enclosed CD (or better still, from the disk image file containing the latest version,

downloaded from our web site) to the Applications folder on your hard drive. You can then drag the icon from your Applications folder to your dock bar to create a shortcut if you wish.

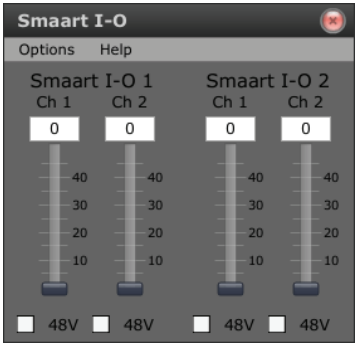
The latest version of the Smaart I-O control applet can be found at:

http://www.rationalacoustics.com/smaart-i-o

If one or more Smaart I-O's is connected to your computer when you run the control program it should automatically detect and connect to all the units it finds. In the case of multiple units, additional control strips are appended to the control applet for each unit found.



Single Device View



Multi-Device View

It is important to keep the control applet running when using the device with Smaart. Smaart does not communicate directly with the Smaart I-O but when the control program is running, it reports input gain settings for all connected units to Smaart (version 7.3.2 or higher). This information is used to ensure that calibrated SPL and spectrum measurements remain calibrated when you adjust the input levels.

When using the Smaart I-O with Smaart you will see some options become enabled in Smaart's Audio Device Options dialog tab and also in the sound level calibration window, that are only available when using an input device whose electrical sensitivity is known to Smaart. Please refer to the Smaart help file for details.

Linking Multiple Devices

The Smaart I-O includes a proprietary scheme for linking the sample clocks between multiple units to ensure that they run at the same rate. This opens up the possibility of making dual-channel transfer function

an impulse response measurements using a reference signal from one Smaart I-O and a measurement signal from another. It may not be necessary in all cases to actually use this feature, as the Smaart I-O can also use time cues from the computer's USB controller to keep its clock running at a highly consistent rate, but physically linking Smaart I-Os to run under a master clock signal provided by a signal designated device still provides an extra measure of consistency.

To synchronize the sample clocks between multiple I-Os, first make sure all units to be linked are disconnected from the computer. Then designate one unit as the clock master and connect an RJ-45 patch cable to its Sync Out port (the bottom RJ-45 jack). Connect the other end of the cable to the Sync In port of a second unit. To add additional Smaart I-Os to the chain chain, connect the Sync out on the second unit to the Sync In on the third and so on.

When all the link cables are installed, connect a USB cable from your computer to the the second unit in the chain. If additional units are to be linked keep working your way down the chain until all units are connected to the computer. The Smaart I-O automatically detects the cable connections on power-up and configures itself appropriately as the clock master or a downstream client, depending on which jacks are populated. The USB LED on the front panel of slaved units changes to Purple to indicate that they are being externally clocked.

Please note that you may still see some variance in delay times from one measurement to the next in dual-channel measurements made using signals from two different devices. This can happen even when the sample clocks are synched between devices, due to ambiguities in the timing of multimedia events by the operating system. What clock linking ensures is that once a measurement is underway, the delay between signals should remain constant for the duration of the measurement. You may therefore wish to designate one microphone as your reference for measuring delays in the system under test and connect that microphone to the same device being used to capture the reference signal.

Warranty & Service

Rational Acoustics LLC warrants the Smaart I-O against defects in materials and workmanship for a period of ONE (1) year from date of original retail purchase. This is a non-transferable warranty that extends only to the original purchaser. Rational Acoustics will repair or replace the product at its discretion at no charge if the product proves to be defective when returned to us, freight charges prepaid. Warranty does not cover or apply to (a) misuse, mishandling, and abuse, (b) products that have been altered (c) products not used in accordance with manufacturer's instructions or recommendations, (d) normal wear and tear, (e) damage that has occurred during shipping, (f) acts of God.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE. RATIONAL ACOUSTICS LLC DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. RATIONAL ACOUSTICS LLC IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING FROM ANY BREACH OF WARRANTY OR UNDER ANY OTHER LEGAL THEORY.

For warranty repair, please contact Rational Acoustics for an RA (return authorization) Number before sending your unit in for evaluation. Product returned without an RA Number may experience delays in evaluation, repair and/or replacement. When sending a unit for repair, please do not include accessories, including carry cases, cables, or adapters. You MUST include proof of purchase with your unit when returning it to Rational Acoustics for warranty repair.

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Technical Support / Bug Reports

For technical support and bug reporting on the Smaart I-O please contact:

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